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Data quality tools for increasing trust in citizen science projects

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Citizen science is characterized by the involvement of amateur (or nonprofessional) scientists, in many cases, contributing with observations done with inexpensive sensors or by their own senses. Many participants are very committed and they strictly follow protocols that ensure some degree of quality while others are not so careful. The main advantage of the approach is that, if many citizens are engaged, the number of observations can be far superior than with conventional approaches. Individual observations are aggregated in dynamic datasets that are composed by contributions of many different observers. The quality of the final result is uncertain and can vary with time or geographical area. The challenge is to qualify data quality of the product in a comparable way. On the other hand, some efforts have been made to define a best practice for facilitating data access in a standard way using Sensor Web Enabling technologies (SWE4CS).
In the H2020 Ground Truth 2.0 project, we are developing a quality assessment tool that that potentially can be applied to any citizen science project that exposes the data following the SWE4CS practices. The tool downloads a subset of the data and represents it in the form of a map. Then, it is possible to select a quality test that is appropriate for the kind of data presented and to assess data quality. The numeric result is expressed using QualityML; a quality vocabulary developed in the FP7 GeoViQua project that ensures semantic interoperability. The results can be later sent to a Geospatial User Feedback database (developed in the context of the H2020 NextGEOSS project) that links the quality measurement with the dataset and stores it in a way that other users can see it. The citizen science community can react and filter the wrong observations or changing their procedures and publish a new quality assessment that demonstrates their progress. The whole process improves the documentation of the dataset while increasing the trust in citizen science data
The tool is contributed to the Citizen Science Interoperability Experiment that is supported by the H2020 project WeObserve and conducted under the OGC innovation program. The objective is to test the tool with other Citizen Science projects and demonstrate the interoperability of the solution.